

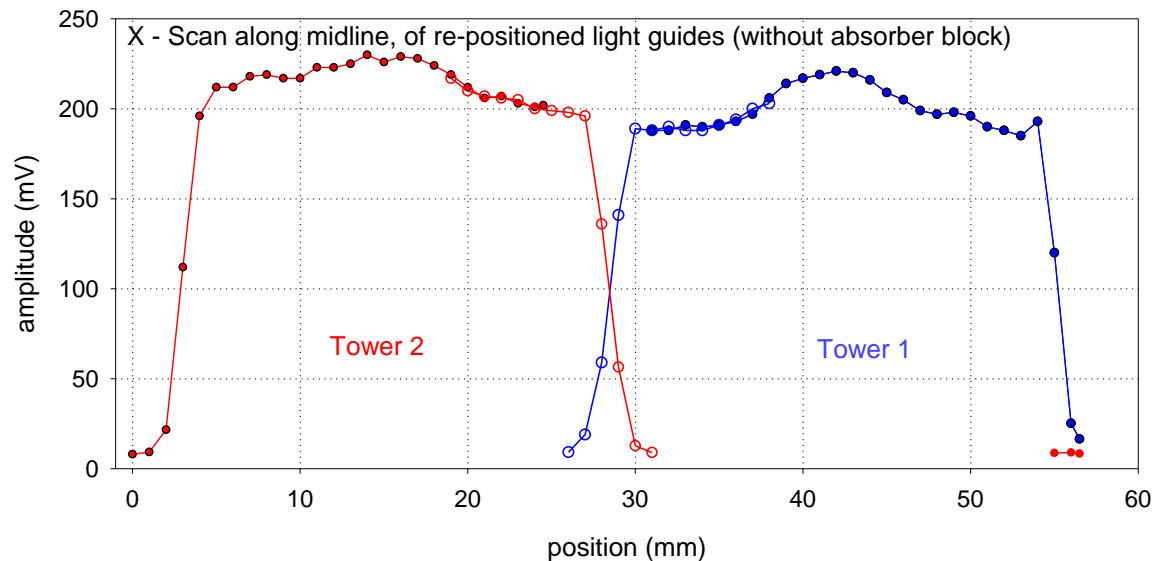
# Light Guide Status and Uniformity

EMCal biWeekly Mtg Aug 30, 2016

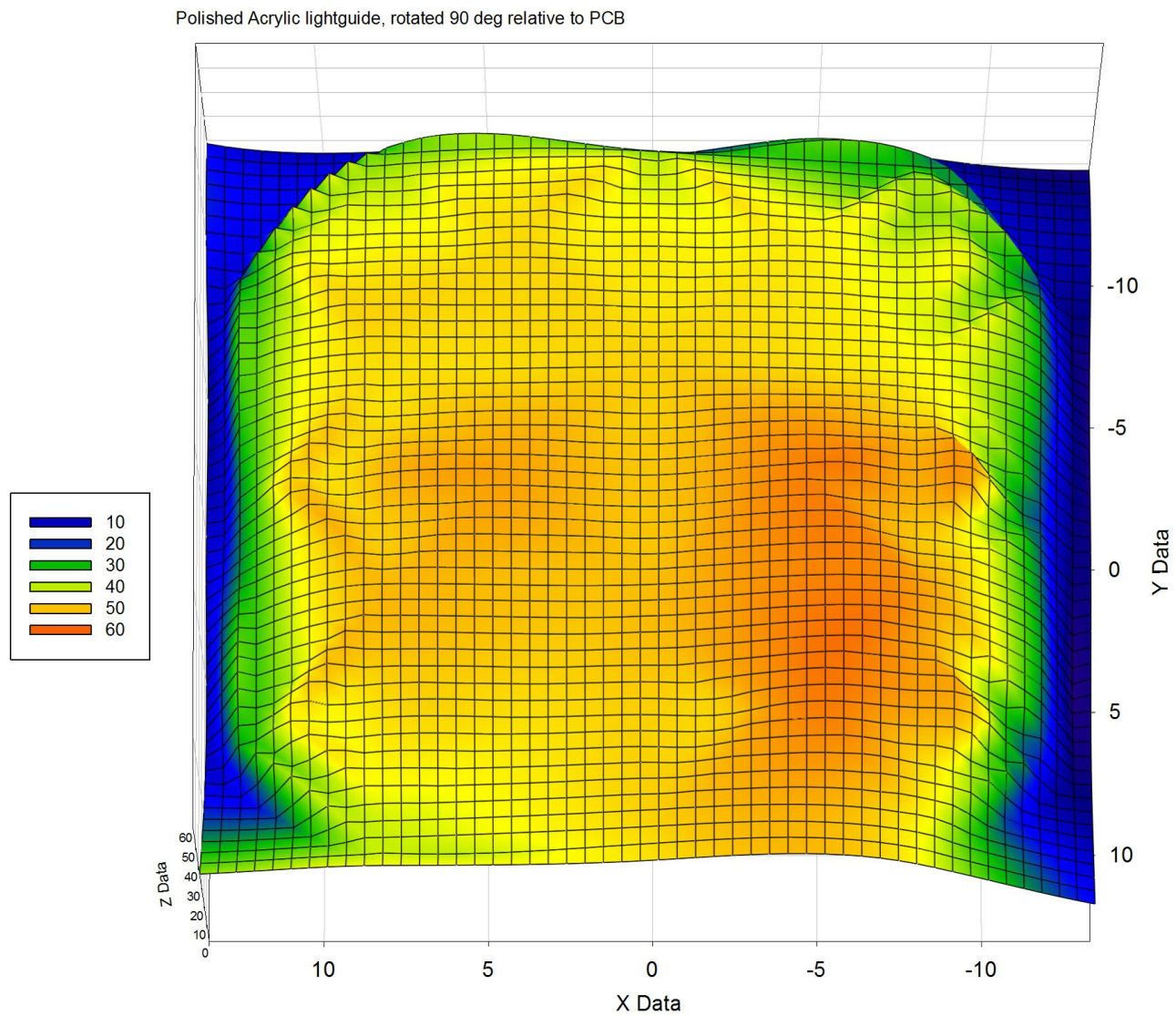
# Prototype Issues:

## Asymmetry / non-uniformity

- Observed asymmetry in the light collection/response appears to be due to a lateral offset of the light guide relative to the sipms. When the light guides are better centered on the sipms, the response becomes more symmetric, but there is still some remaining non-uniformity. Possibly due to positioning of sipms (6mm x 7mm ) or lightguide dimensions (26.3mm x 23.3 mm)?

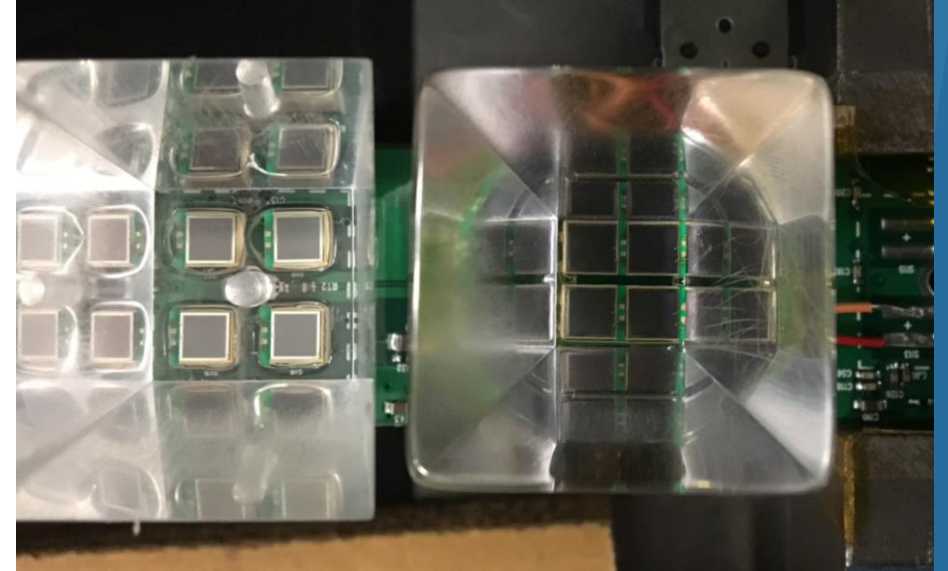
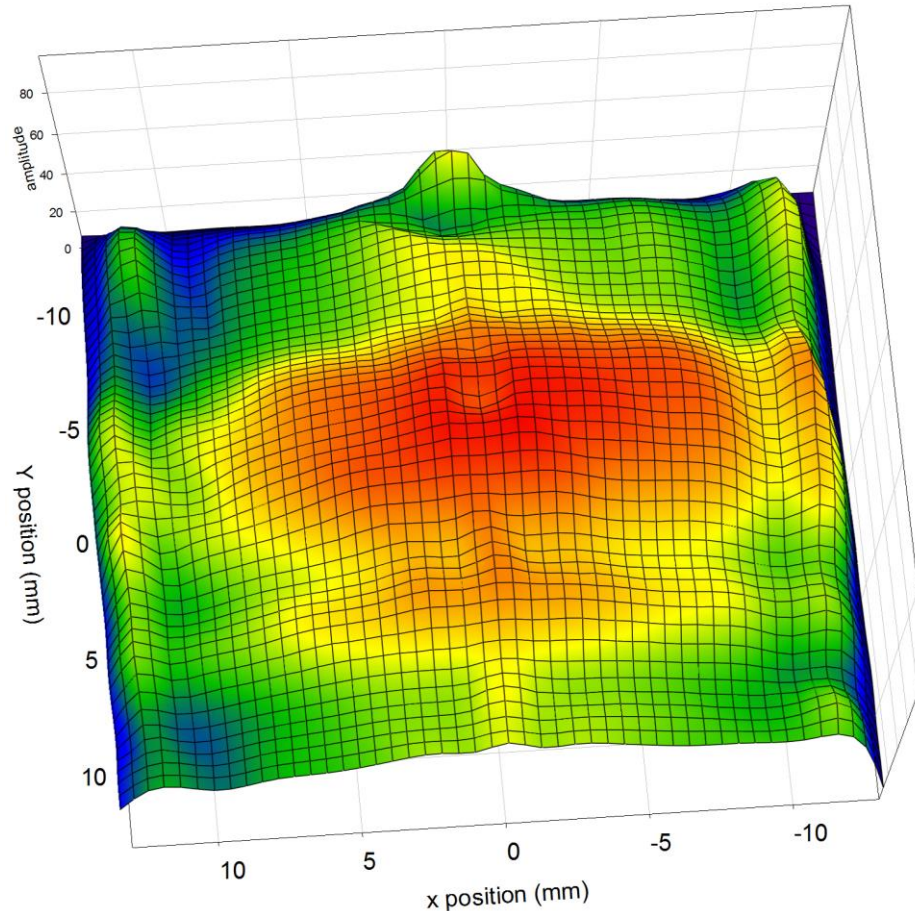


Acrylic LG rotated 90 deg to better fit footprint of sipms

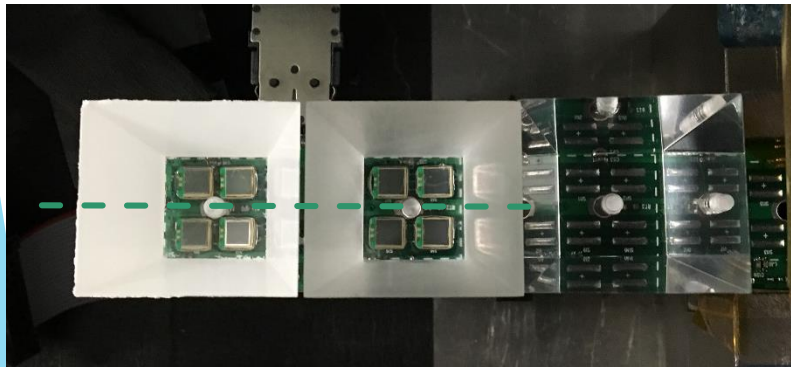
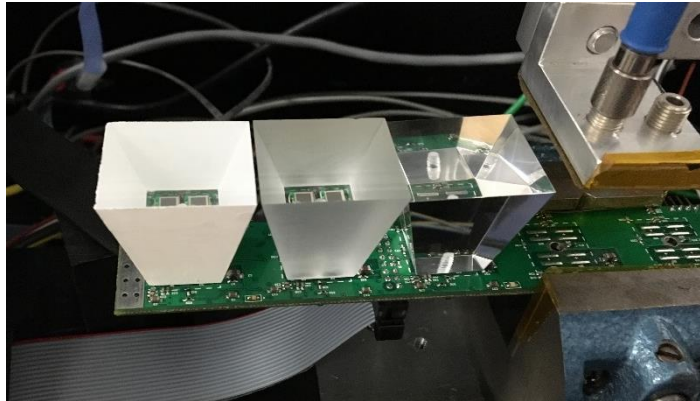
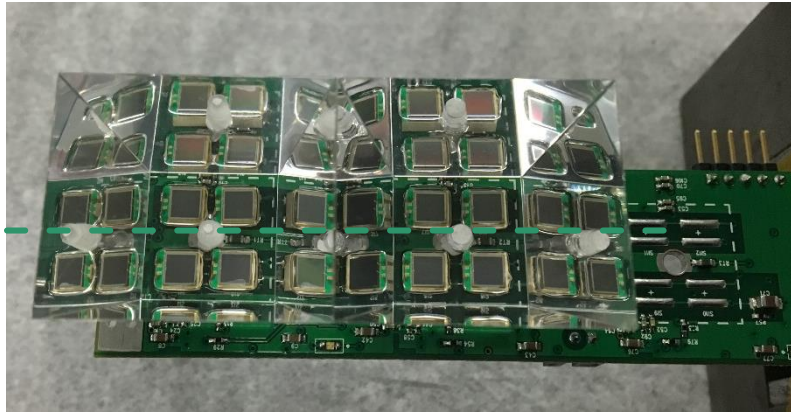


Earlier machined acrylic LG design, with closer sipm spacing  
- shows “gutter effect?” peaks as seen in Mike Phipps’ simulation

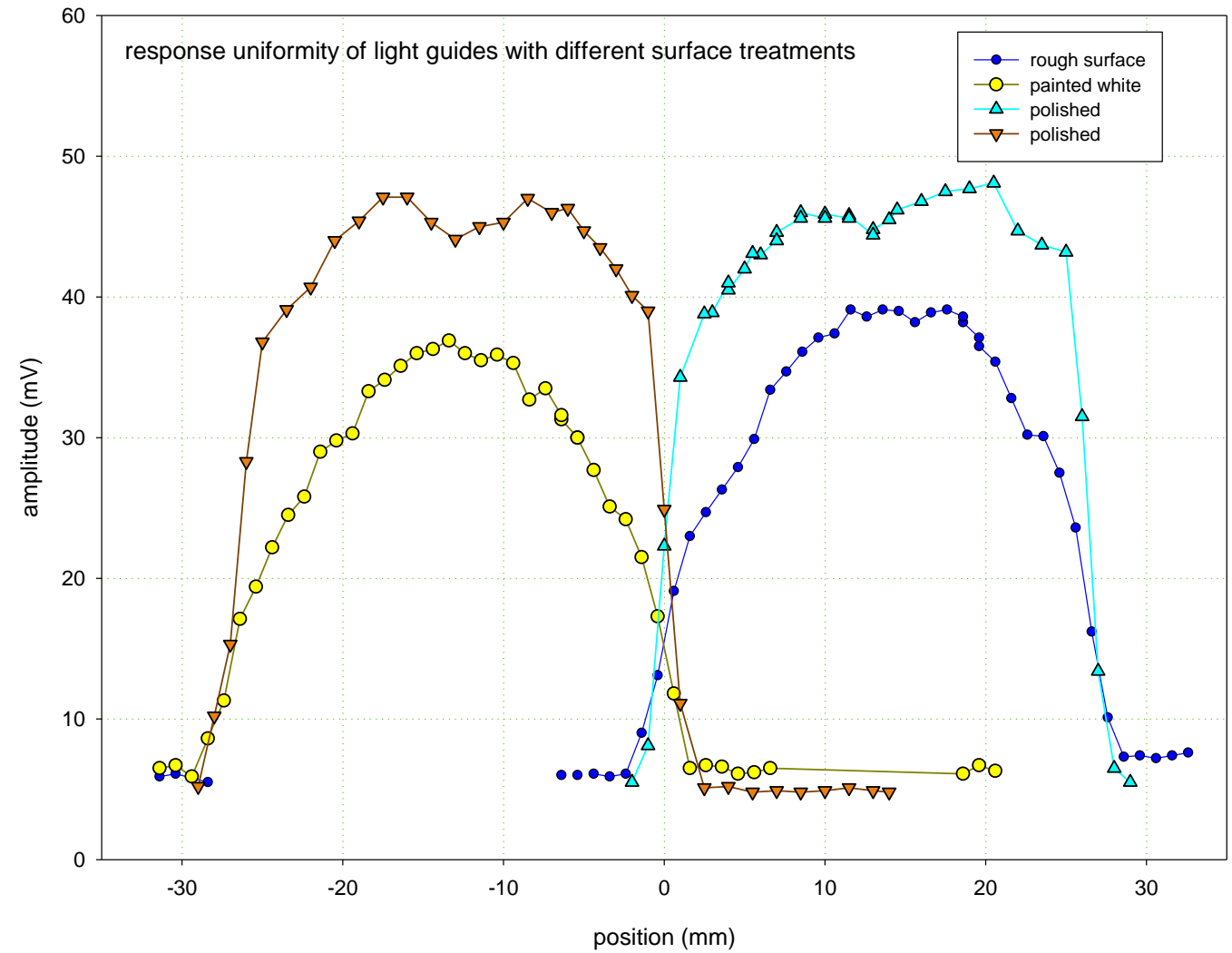
- Need to compare overall efficiencies
- Would need to come up with another way to mount it (no screw hole)

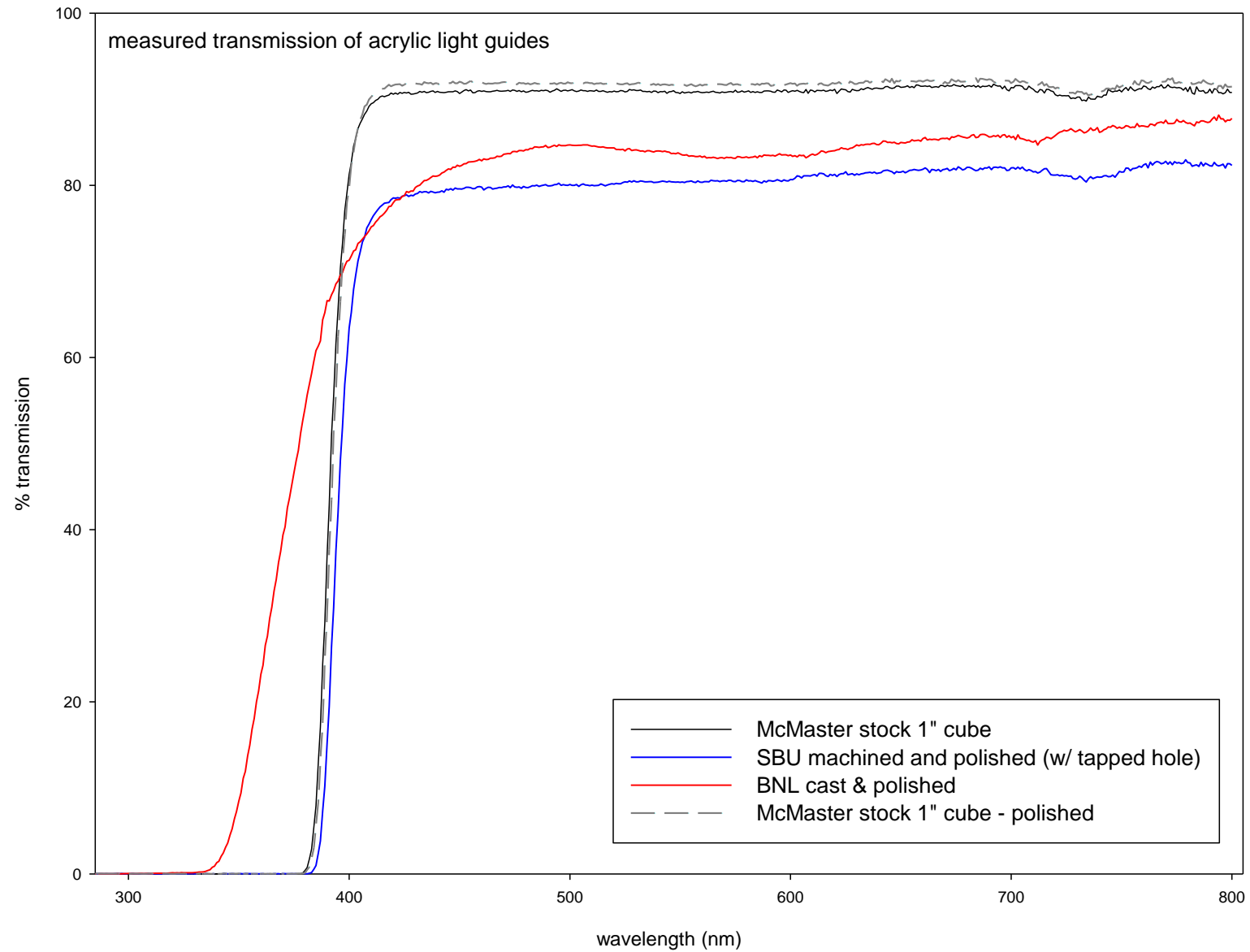




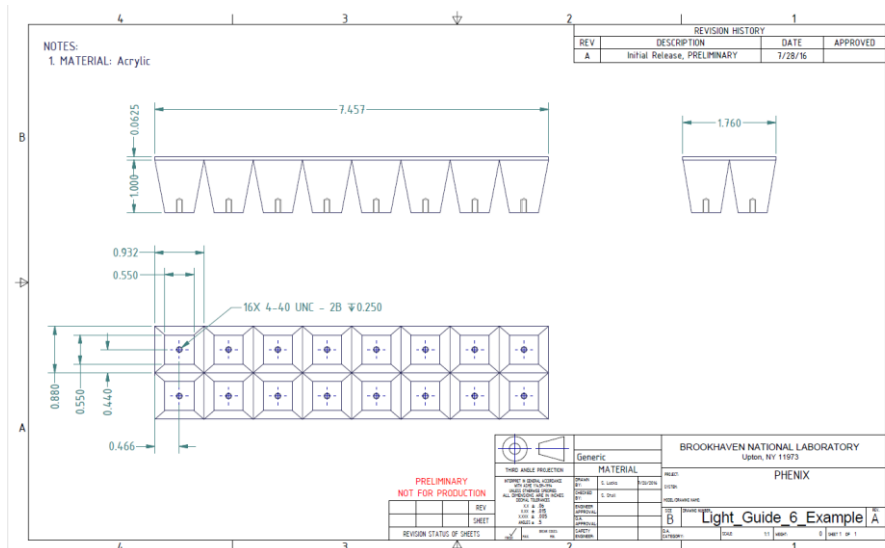


## Effect of Surface treatments on response





- Spoke with plastics manufacturing companies about injection molding of light guide assembly (2x8)
- ProtoLabs, Natech Plastics, Hansa Plastics
- Some issues with process/design:
  - Material thickness may cause deformities as acrylic cures
  - Size/complexity of part/mold - would be easier to make individual towers, possibly multiple shapes in one mold.
- Initial quote from ProtoLabs - \$6.70 per piece for ~1200 2x8



## ② Manufacturability Analysis (3D View) [View in 2D](#)

REQUIRED CHANGES (5)

MOLDABILITY ADVISORY (4)

OTHER INFO (1)

The following illustrations indicate changes to the model which are required for compatibility with our injection molding process.

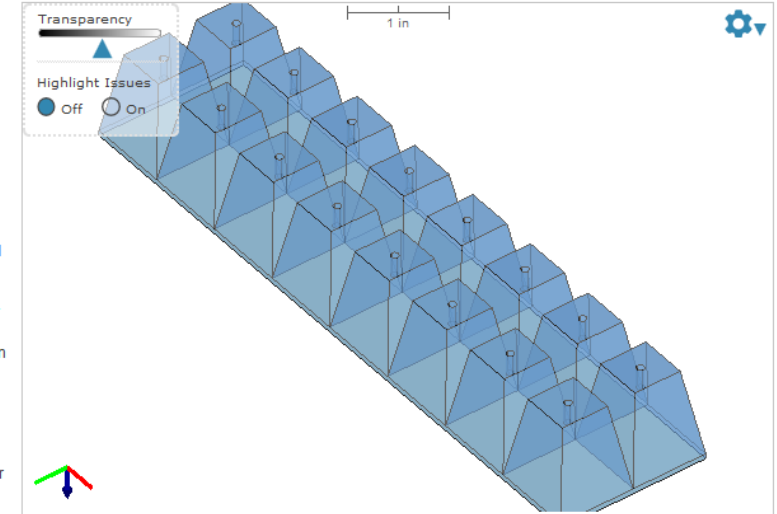
### Required Changes:

1. Draft needed
2. Thin Slot
3. Thick area
4. Thick area
5. Thick part

### Thick part

This part is very thick. Sink marks, internal voids, excessive shrink and warp are likely. There will be large gate vestige(s). To ensure good parts you will need to redesign your part. See the [Recommended Wall Thicknesses by Resin Types](#) design page and [Uniform Wall Thickness](#) design page for design guidelines. For details, clarification, options, or alternatives, please contact a [Customer Service Engineer](#) at [customerservice@protolabs.com](mailto:customerservice@protolabs.com) or call 877-479-3680.

An updated file is needed to make this part.



[View as a 3D PDF](#)



[Problems with the 3D Viewer?](#)

## ③ Summary

### Order Pricing

#### Specifications Selected

Cavities	1	Tooling Price:	\$3,840.00
A-side (green) finish:	PM-F1	Sample Parts 25 @ \$6.69:	\$167.25
B-side (blue) finish:	PM-F0		
Sample Quantity:	25		
Manufacturing Time:	Sample parts ship in 15 business days (standard price)		
Material:	Acrylic (PMMA), Clear (Plexiglas V052-100)		

Total USD: **\$4,007.25**  
[currency calculator](#)

**⚠ To continue, see required changes in the section above and upload a new model.**

[Add to Cart](#)

[Upload a Revised Model](#)


Updated quote for 2x2 part

w/ polished surfaces

proto labs  
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# ProtoQuote®

## Injection Molding Quote

Prepared for: **Battelle & SUNY for SBU / Brookhaven National Lab**  
Process: **Plastic Injection Molding**  
Quote Number: **473981**  
Quote Date: **8/18/2016**  
Part Name: **Light\_Guide\_20 rev -02**  
Extents: **51.507 mm x 49.442 mm x 28.401 mm**



**Thank you for the opportunity to quote your parts.** We look forward to working with you on this project. If you have any questions, please contact us at 877.479.3680.

### 1 Confirm or Modify Specifications and Review Pricing

Cavities:	<input type="text" value="1 cavity"/>	
A-side (green) finish:	<input type="text" value="SPI-B1 (600 paper)"/>	
B-side (blue) finish:	<input type="text" value="SPI-A2 (High polish)"/>	
Tooling Price:		\$5,030.00
Sample Quantity:	<input type="text" value="25"/>	Sample Parts 25 @ \$3.46: \$86.50
Material:	<input type="text" value="Acrylic (PMMA), Clear (Plexiglas V052-100)"/>	
	<input type="button" value="Change Material Color"/>	
Manufacturing Time:	<input type="text" value="Sample parts ship in 15 business days (standard price)"/>	

Total USD:   
currency calculator



- Also requested quotes from
  - Plastic Optics Inc / Align Optics
  - Luxexcel (3D printed optics)
  - Empire Precision
  - Diverse Optics
  - Natech Plastics
- Luxexcel (Netherlands) was communicative, but has a limit (20mm) on the height of the parts they can produce.
- Natech Plastics quoted: \$20-24k for the mold, \$2-3 per piece
- Have not yet received quotes from the others.